



## NIDCD Fact Sheet **Smell Disorders**

U.S. DEPARTMENT OF HEALTH & HUMAN SERVICES · NATIONAL INSTITUTES OF HEALTH · NATIONAL INSTITUTE ON DEAFNESS AND OTHER COMMUNICATION DISORDERS

### **How common are smell disorders?**

Our sense of smell helps us enjoy life. We delight in the aromas of our favorite foods or the fragrance of flowers. Our sense of smell is also a warning system, alerting us to danger signals such as a gas leak, spoiled food, or a fire. Any loss of our sense of smell can have a negative effect on our quality of life. It also can be a sign of more serious health problems.

Roughly 1–2 percent of people in North America say that they have a smell disorder. Problems with smell increase as people get older, and they are more common in men than women. In one study, nearly one-quarter of men ages 60–69 had a smell disorder, while about 11 percent of women in that age range reported a problem.

Many people who have smell disorders also notice problems with their sense of taste. To learn more about your sense of taste, read the NIDCD fact sheet *Taste Disorders* at <http://www.nidcd.nih.gov/health/smelltaste/taste.asp>.

### **How does our sense of smell work?**

Our sense of smell—like our sense of taste—is part of our chemosensory system, or the chemical senses.

Specialized sensory cells, called olfactory sensory neurons, are found in a small patch of tissue high inside the nose. These cells connect directly to the brain. Each olfactory neuron expresses one odor receptor. Microscopic molecules released by substances around us—whether it's coffee brewing or a pine

forest—stimulate these receptors. Once the neurons detect the molecules, they send messages to our brain, which identifies the smell. (Because there are more smells in the environment than there are receptors, a given molecule may stimulate a combination of receptors. This response is registered by the brain as a particular smell.)

Smells reach the olfactory sensory neurons via two pathways. The first pathway is through our nostrils. The second pathway is through a channel that connects the roof of the throat region to the nose. When we chew our food, aromas are released that access the olfactory sensory neurons through this channel. If the channel is blocked, such as when our noses are stuffed up from a cold or flu, odors cannot reach the sensory cells and much of our ability to enjoy a food's flavor is lost. In this way, our senses of smell and taste work closely together. Without the olfactory sensory neurons, familiar flavors such as chocolate or oranges would be hard to distinguish. Some people who go to the doctor because they think they've lost their sense of taste are surprised to learn that they have a smell disorder instead.

Our sense of smell is also influenced by something called the common chemical sense. This sense involves thousands of nerve endings, especially on the moist surfaces of the eyes, nose, mouth, and throat. These nerve endings help us sense irritating substances such as the tear-inducing power of an onion or the refreshing cool of peppermint.



# NIDCD Fact Sheet

## Smell Disorders

### What are the smell disorders?

People who experience smell disorders either have a loss in their ability to smell or changes in the way they perceive odors. Hyposmia is a reduced ability to detect odors. Anosmia is the inability to detect odors at all. People who experience changes in how they sense odors may notice that familiar odors are distorted or that something that normally smells pleasant now smells foul. Other people may sense an odor that isn't present at all.

### What causes smell disorders?

Smell disorders have many causes, with some more obvious than others. Most people who develop a smell disorder have experienced a recent illness or injury. Common causes of smell disorders are:

- Sinus and other upper respiratory infections
- Polyps in the nasal cavities
- Frontal head injuries
- Hormonal disturbances
- Dental problems
- Exposure to certain chemicals, such as insecticides and solvents
- Numerous medications, including some common antibiotics and antihistamines
- Radiation associated with the treatment of head and neck cancers
- Aging
- Other health issues that affect the nervous system, such as Parkinson's disease or Alzheimer's disease

In 2009, the U.S. Food and Drug Administration warned consumers to stop using several popular cold remedies because they could result in the loss of smell. Smoking also can interfere with our sense of smell.

### How are smell disorders diagnosed?

Both smell and taste disorders are treated by an otolaryngologist, a doctor who specializes in diseases of the ear, nose, throat, head, and neck. Some tests are designed to measure the smallest amount of odor that patients can detect. Another common test consists of a booklet of sheets that contain tiny beads filled with specific odors. Patients are asked to scratch each sheet and identify the odor.

An accurate assessment of your smell disorder will include, among other things, a physical examination of your ears, nose, and throat; a review of your health history, such as exposure to toxic chemicals or trauma; and a smell test supervised by a health care professional.

### Are smell disorders serious?

Like all of our senses, our sense of smell plays an important part in our lives. The sense of smell often serves as a first warning signal, alerting us to the smoke of a fire, spoiled food, or the odor of a natural gas leak or dangerous fumes.

When smell is impaired, some people change their eating habits. Some may eat too little and lose weight while others may eat too much and gain weight. Food becomes less enjoyable and people may use too much salt to improve the taste. This can be a problem for people with certain medical conditions, such as high blood pressure or kidney disease. In severe cases, loss of smell can lead to depression.

Problems with our chemical senses may be a sign of other serious health conditions. A smell disorder can be an early sign of Parkinson's disease, Alzheimer's disease, or multiple sclerosis. It also can accompany or signal obesity, diabetes, hypertension, and malnutrition. If you are experiencing a smell disorder, consult your physician.

### Can smell disorders be treated?

Many types of smell disorders are curable, and for those that are not, counseling is available to help people adjust to the problem.

Diagnosis by a doctor is important to identify and treat the underlying cause of a potential smell disorder. If your problem is caused by certain medications, talk to your doctor to see if lowering the dosage or changing that medicine may reduce its effect on your sense of smell. Surgery to remove nasal obstructions such as polyps can restore airflow. Some people recover their ability to smell when the illness causing their olfactory problem is resolved. Occasionally, a person may spontaneously recover his or her sense of smell.

### What research is being done?

The National Institute on Deafness and Other Communication Disorders (NIDCD) supports basic and clinical investigations of smell and taste disorders at institutions across the nation. Some of these studies are conducted at chemosensory research centers, where scientists are making discoveries that help them understand our olfactory system and may lead to new treatments for smell disorders.

Some of the most recent research into our sense of smell is also the most exciting. In 2004, NIDCD grantee Linda B. Buck, Ph.D., together with Richard Axel, M.D., received the Nobel Prize in Physiology or Medicine for their discovery of a family of about 1,000

olfactory receptor genes that encode the receptors found on olfactory sensory neurons—one receptor per neuron. Recent studies on how olfactory sensory neurons recognize odors, aided by new technology, are revealing how our olfactory system detects and identifies the differences between the many chemical compounds that form odors.

Like our sense of taste, our sense of smell can be damaged by certain medicines. However, other medications, especially those prescribed for allergies, may improve the sense of smell. NIDCD-supported scientists are working to find out why this is so in an effort to develop drugs that can help restore a person's sense of smell.

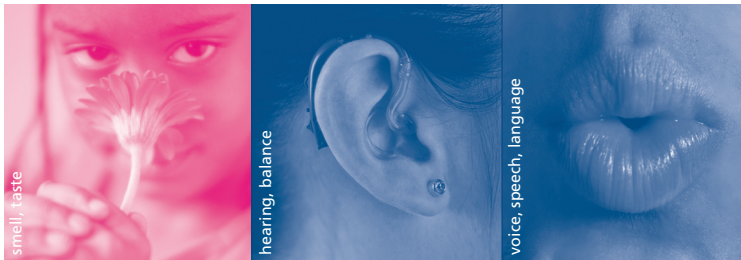
NIDCD-supported researchers have found that the loss of smell affects the choices an older person makes about eating certain foods. Food choices impact diet and overall health. They are looking at how and why this takes place in order to develop more effective ways to help older people—especially those with chronic illnesses—cope better with problems with smell and to maintain proper nutrition.

Olfactory sensory neurons—as well as sensory cells that help us taste—are the only sensory cells that our bodies regularly replace. Scientists are exploring why and how this happens so that they might find ways to replace other damaged sensory and nerve cells.

NIDCD-supported chemosensory scientists are exploring how to:

- Promote the regeneration of sensory and nerve cells.
- Understand the effects of the environment (such as gasoline fumes, chemicals, and extremes of relative humidity and temperature) on smell and taste.

**more →**



NIDCD supports and conducts research and research training on the normal and disordered processes of hearing, balance, smell, taste, voice, speech, and language and provides health information, based upon scientific discovery, to the public.

- Prevent the effects of aging on smell and taste.
- Prevent infectious agents and toxins from reaching the brain through the olfactory nerve.
- Develop new diagnostic tests for taste and smell disorders.
- Understand associations between chemosensory disorders and altered food intake in aging as well as in various chronic illnesses.
- Improve treatment methods and rehabilitation strategies.

### **What can I do if I think I have a smell disorder?**

Proper diagnosis by a health professional, such as an otolaryngologist, is important. Diagnosis may lead to an effective treatment of the underlying cause of your smell disorder. Many types of smell disorders are curable. For those that are not, counseling is available to help patients cope.

### **Where can I find more information?**

The NIDCD maintains a directory of organizations that can answer questions and provide printed or electronic information about hearing, balance, smell, taste, voice, speech, and language. This directory is available at <http://www.nidcd.nih.gov/directory>.

To find organizations with information specifically about smell disorders, click on "Smell and Taste" in the "Browse by Topic" list.

For more information, additional addresses and phone numbers, or a printed list of organizations, contact:

#### **NIDCD Information Clearinghouse**

1 Communication Avenue  
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Toll-free Voice: (800) 241-1044  
Toll-free TTY: (800) 241-1055  
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